Tierras Morenas Wind Farm

Location: Guanacaste region
Type: Utility-scale wind farm
Size: 24 MW
Funding: Total: US$35,000,000, from combined private and public sources
Objective: To generate electricity without greenhouse gas (GHG) or other pollutant emissions.
Duration: 1999
Scale: Rural

Summary

The 24-MW Tierras Morenas Wind Farm is one of the largest wind projects in Latin America and has one of the best performance and output records in the hemisphere. The project provides diversity and resilience of electricity supply and generates no air pollution, water pollution, or GHG emissions. Government commitment to environmentally sustainable development helped attract investment from a private consortium.

In-Country Principles That Attracted Nondonor Financing

- Capacity building and informed decision making
- Public participation in, and support of, sustainable development
- Institution building and access to justice and enforcement of laws

A key factor that helped attract private financing was increased public knowledge of, and participation in, energy decision making. Public access and public participation were facilitated through the institutionalizing of sustainable education, communication, and outreach programs through capacity building and innovative financing.

The Government of Costa Rica's commitment to environmentally sustainable development and resource use and reduced GHG emissions, as demonstrated by its goal to develop 60 MW of wind energy generating capacity, also helped attract private-sector investment. A long-term power purchase agreement with the local utility, as opposed to spot-market trading, was also instrumental in attracting private financing.

Financing

Total project investment was US$35,000,000. Roughly US$24,000,000 came from private and public loan and grant support from five Costa Rican banks and the Central American Bank for Economic Integration.

Supplemental funding for the project came from the Danish International Development Agency (DANIDA). This bilateral government support for wind power helped attract investors and reduce up-front installation costs.

The project was built under a fixed price, turnkey contract backed by service agreements and warranties.

The Project

Located near Lake Arenal in Tilarán de Guanacaste, the project consists of 32 wind turbine generators that produce about 70,000 MWh of electricity per year. The project sells this generation to the Instituto Costarricense de Electricidad (ICE), the state-owned national electric utility, under a 15-year power purchase agreement.

The Tierras Morenas project complements ICE's hydro-intensive generation mix, because its wind regime is strongest during Costa Rica's dry season.

Increased electricity production with no pollution helps improve lighting and health in the region.

Technical Data

The 24-MW wind farm consists of 32 NEG Micon 750/44-kW wind turbines, each with 44-m rotors and 40-m towers. The turbines have three blades, a 690-V generator, and are computer-controlled.

The generated electricity feeds into the ICE through the main switch house and an 11-mi overhead feeder line built over difficult terrain.

The generation of electricity produces no air emissions, and environmental impacts associated with the materials used to manufacture the wind turbines are addressed through the manufacturer's environmental policy, which calls for increasing environmental standards from its suppliers.

Performance Data

The project has reduced GHG (carbon dioxide [CO_2]) emissions by an estimated 57,200 tons due to the displacement of fossil fuels that otherwise would have been used to generate the electricity. The project causes no disruption to pre-existing land use. It allows ranching and farming to continue up to the foot of the turbines and provides more than two dozen full-time, well-paid jobs.

Despite logistical, cultural, and climatic challenges, the project was completed ahead of schedule with a perfect safety record and high degree of design and construction quality.

The annual capacity factor for the farm is about 45%.

Maintenance costs are low, and the turbines are safe enough that in Denmark, they are installed in recreational parks and public areas.

Participants and Roles

Energia Global International (EGI), developed the plant, NEG Micon manufactured the turbine generators, Zilkha Renewable Energy organized the financing partnership, and ICE purchases the electricity. The project is part of the United States Initiative on Joint Implementation (USIJI), sponsored in part by the US Department of Energy.

Partner Contacts

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